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A COMPARISON OF THREE INTERVENTIONS FOR INCREASING ORAL READING PERFORMANCE: APPLICATION OF THE INSTRUCTIONAL HIERARCHY

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The instructional hierarchy is a behavior-analytic model that links level of academic skill development (i.e., acquisition, fluency, generalization, adaptation) with appropriate instructional techniques. The present study used the instructional hierarchy to compare the effects of three instructional interventions (listening passage preview, subject passage preview, and taped words) on subjects' oral reading performance on word lists and passages. Subjects were 4 male students with learning disabilities who ranged in age from 8 years 10 months to 11 years 11 months. A multielement design was used to compare the effects of the three interventions to each other and to baseline. Results indicated that the listening passage preview intervention (which contained modeling, drill, and generalization components) produced the largest performance gains. The implications of these results for selecting academic interventions based on the instructional hierarchy are discussed.

DESCRIPTORS: oral reading, learning disabled, multielement design

Numerous studies have demonstrated the effectiveness of behavior-analytic procedures for increasing students' academic skills, including error correction for oral reading fluency and word list reading (Barbetta, Heron, & Heward, 1993; Barbetta, Heward, & Bradley, 1993; Rose, McEntire, & Dowdy, 1982; Singh, 1990); self-monitoring, modeling, and prompting for sight-word acquisition (Espin & Deno, 1989; E. Lalli & Shapiro, 1990); and drill for vocabulary building (Shapiro & McCurdy, 1989; Skinner & Shapiro, 1989). By comparison, researchers have devoted considerably less attention to explaining in a systematic and conceptual manner the relative effects of these different interventions on learner behavior. As a result, behavior-analytic research on academic interventions has not been "conceptually systematic" (Baer, Wolf, & Risley, 1968), an important dimension of applied behavior analysis.

One model applicable to research in this area is known as the *instructional hierarchy*. The instructional hierarchy is a heuristic framework for generating instructional treatments based on level of skill development first described by Haring, Lovitt, Eaton, and Hansen (1978). Level of skill development refers to the stage of learning (i.e., acquisition, fluency, generalization, adaptation) most applicable for a given learner's performance of a target behavior. Each stage of the instructional hierarchy is associated with specific instructional procedures that serve to facilitate mastery at that level (i.e., modeling and prompting for acquisition, drill and reinforcement for fluency building, training in the natural context for generalization, and solving novel problems for adaptation). Recent advances in functional analysis and functional assessment technology have shown that pretreatment assessment of the variables maintaining behavior can facilitate treatment selection and lead to improved treatment gains (e.g., Iwata, Pace, Kalsher, Cowdery, & Cataldo, 1990; Kern, Childs, Dunlap, Clarke, & Falk, 1994; J. Lalli, Browder, Mace, & Brown, 1993). The instructional hierarchy represents a similar assessment model in that appropriate instructional interventions can be prescribed based on pretreatment

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Table 1
Subjects' Demographic Information

Variable	Subject 1	2	3	4
Age[a]	8, 10	10, 1	11, 11	11, 11
Aptitude test score	92[b]	98[c]	95[c]	89[c]
Achievement test score	80[d]	77[e]	66[d]	61[f]
Oral reading screening				
Accuracy	44	48	57	67
Fluency[g]	11	9	17	25

[a] In years, months.
[b] Kaufman Assessment Battery for Children.
[c] Wechsler Intelligence Scale for Children—Revised.
[d] Kaufman Test of Educational Achievement Reading Decoding Subtest.
[e] Kaufman Test of Educational Achievement Reading Composite.
[f] Diagnostic Achievement Battery Reading Quotient.
[g] Words read correctly per minute.

assessment of an individual's level of skill development and knowledge of the corresponding learning principle.

In the present study, we examined predictions about gains in academic performance made by the instructional hierarchy as described by Haring et al. (1978). Three currently researched instructional interventions were used. The specific instructional components to be examined were modeling (an acquisition procedure), drill (a fluency procedure), and training under criterion stimulus conditions (a generalization procedure). The instructional components of each intervention were specified according to the instructional hierarchy, and interventions were compared for their effectiveness at increasing reading performance in and out of context (i.e., passages vs. word lists).

The three instructional interventions used included two passage previewing techniques (Rose, 1984a, 1984b, 1984c) and a taped words procedure (Skinner & Shapiro, 1989). The two passage-previewing techniques were subject passage preview (SPP), in which the subject reads a passage independently before being assessed, and listening passage preview (LPP), in which the experimenter reads the passage while the subject follows along. In the taped words (TW) intervention, the subject reads along with a list of words presented by audiotape. The TW and LPP procedures each contain an acquisition component—accurate responding is modeled in the presence of unknown stimuli. The SPP and LPP procedures both contain a fluency component in that each provides for drill through repetition of accurate responding on already acquired material. For the SPP technique, however, there is no modeling of unknown words. Finally, only the LPP intervention contains a generalization component for unknown words in passage reading, because the intervention occurs under stimulus conditions in which fluent reading is expected to be demonstrated (using passages from the classroom basal reading curriculum).

Based on the content analysis of each intervention, LPP was expected to have the greatest effect on passage reading (both accuracy and fluency) because it contains acquisition, fluency, and generalization components. SPP was also expected to increase passage reading fluency because it contains a drill component. TW was expected to increase accuracy on word-list reading only because lists of unknown words are modeled for subjects on the tape.

METHOD

Subjects

Four students with learning disabilities in reading participated as subjects. Each student had been classified by a team of support personnel in their school district based on a discrepancy in performance between standardized measures of aptitude and achievement (Reynolds & Stowe, 1985). Each student received 1 hr per day of special education instruction.

Demographic information for each of the 4 subjects is presented in Table 1. All participants were male, with an average age of 10 years 8 months at the beginning of the study. Students had a mean IQ score of 93.5 and a mean reading achievement score of 71.

Materials

Passages. Twenty-eight passages of approximately 50 words each were selected randomly from

the students' curricular basal reading series (Pearson et al., 1989). Only narrative and expository texts were candidates for selection. Subjects' current reading levels were determined by teacher interview and curriculum-based measurement screening. Consistent with their learning disability in reading, Subjects 1 and 2 were receiving instruction on a first-grade reading level and Subjects 3 and 4 were receiving instruction on a second-grade reading level. Subjects were screened using three randomly chosen passages from the third-grade reader in order to estimate oral reading accuracy and fluency. Passages that were at least one grade above current instructional level were used to insure that the subjects were not receiving instruction in the same materials used for the experimental manipulations. Also, selecting third-grade passages enabled us to use the same instructional materials for all 4 subjects while reducing the likelihood of obtaining a ceiling effect for accuracy during baseline. Although the passages were deemed to be difficult for all subjects, they were expected to be more difficult for Subjects 1 and 2.

Subjects were screened based on reading fluency (the number of words read correctly per minute) and reading accuracy (the percentage of correctly read words) from readings of three randomly selected passages (Shinn, 1989). To be included in the study, subjects had to show significant deficits in reading (below 80% accuracy and less than 60 words read correctly per minute). As shown in Table 1, the 4 subjects correctly read between 9 and 25 words per minute ($M = 15.5$) with between 44% and 67% accuracy ($M = 54\%$).

All 28 passages were assigned to the baseline and three treatment conditions using a stratified random sampling procedure. The subjects read each of the texts prior to baseline, and accuracy and fluency were recorded. Texts were then ranked from least difficult to most difficult according to fluency and randomly assigned to one of the four conditions. The assignment of texts in blocks according to fluency insured an equal distribution of text difficulty across conditions.

Word lists. Word lists were generated from the passages for the purpose of assessing known and unknown words. These word lists were a part of the assessment at the end of each instructional day and were also used for the TW treatment condition. Word lists for both assessment and TW were generated in a two-step screening process. First, subjects read all 28 passages orally. Words that were mispronounced, omitted, or not read in 3 s were called "unknown" and were put in random order on a master word list. Subjects then attempted to read orally from word lists all of the words not read correctly on passages. The remaining unknown words were compiled into lists and assigned to the same baseline or experimental condition as their corresponding passages.

On the assessment word lists administered during baseline and following treatment, known words were also included (33%) to increase subjects' attention to the task. The TW lists contained only unknown words (i.e., words not read correctly on the passage or on the word list) from the corresponding passage. The number of words on both types of lists varied individually according to how many known and unknown words there were for each passage.

Dependent Measures

Four dependent measures were used to assess the effects of treatment conditions on reading performance: accuracy and fluency on passages and word lists. An audiocassette recorder was used to tape the students' word-list and passage-reading samples for the purpose of assessing interscorer reliability.

Experimental Design

A multielement design was used to compare treatment conditions; each intervention was associated with different instructional materials and directions (Sindelar, Rosenberg, & Wilson, 1985). Although the passages assigned to each condition were of equal difficulty, subjects were expected to discriminate conditions on the basis of the different instructions. Having subjects read a different passage each day was also expected to reduce the likelihood of multiple treatment interference influencing the results.

Following baseline, one of the three instructional procedures was taught per session. Each treatment

was administered once per 3-day instructional sequence during the 21 instructional days.

Procedure

Sessions were conducted once or twice daily by either the special education teacher or an experimenter. The special education teacher conducted approximately 80% of the sessions. The word list reading and oral passage reading components that followed each treatment constituted the assessment procedures. The order of the assessment procedures was randomized across baseline and instructional days.

Baseline. Baseline was implemented for 7 days, during which there was no direct reading instruction on the passages or word lists. The subject was asked to read a word list and the corresponding passage, presented in randomized order. The subject read out loud the entire word list or passage assigned to that session. If the subject was unable to read a word within 3 s, the experimenter told him to go on to the next word.

Subject passage preview. In the SPP condition, the subject first read the passage assigned to that instructional day orally without help from the experimenter. When the subject indicated that he was done reading the passage orally, he read the corresponding word list and the same passage again in randomized order.

Taped words. In the TW condition, the subject first read along with the audiotape of the word list assigned to that instructional day. The words were read into the recorder by the experimenter at a rate of 80 words per minute (Skinner & Shapiro, 1989). The subject read the words out loud to insure that he was performing the task. The subject then read the word list and the passage in randomized order to assess performance.

Listening passage preview. In the LPP condition, the subject listened to the audiotape of the passage while following along with his finger. Passages were presented via audiotape in order to control for nonspecific treatment effects not shared with the TW condition. The passages were read into the recorder by the experimenter at a rate of 130 words per minute (Rose & Beattie, 1986). Following the passage with a finger was taken as an indication that the subject was reading along with the audiotape. The subject then read the word list assigned to that instructional day and the same passage again in randomized order.

The subject was required to read the passage once before being assessed in both the SPP and LPP conditions. For the TW condition, the subject read all unknown words from the passage once in isolation prior to assessment. The modeling, drill, and generalization components of the instructional hierarchy dictated that time spent reading and amount of exposure to the passages differed between some treatments (i.e., SPP and LPP vs. TW). Therefore, these differences were viewed as integral parts of the intervention procedures.

Interscorer Agreement

An independent observer scored a random sample of 10 passages and word lists across the 28 instructional sessions (35.7%) to assess interscorer agreement. Interscorer agreement was computed on a word-by-word basis for words read correctly and incorrectly using Cohen's kappa (Cohen, 1960). The resulting kappa coefficient was .95 across the 10 passages and .81 across the 10 word lists.

Treatment Integrity

A trained observer measured treatment integrity during nine of the sessions (32%) using a checklist. During treatment, the observer recorded whether or not (a) materials were present, (b) instructions were read, (c) the proper sequence of treatment and assessment was followed, (d) the assessment conditions were implemented correctly, and (e) treatment conditions were implemented correctly. The observer also recorded whether the unique features of each treatment were implemented correctly. During assessment (word-list reading and passage reading), the observer recorded whether or not the experimenter (a) said "next" after 3-s hesitations during word-list reading and (b) waited 3 s before saying the word to the subject during passage reading. The mean correct implementation of experimental conditions was 100% across the two baseline checks, 97.5% across the four TW checks (range,

Table 2
Subjects' Mean Accuracy and Fluency (Words Read Correctly Per Minute) on Passages and Word Lists (in Parentheses)

Subject	Condition			
	Baseline	SPP[a]	TW[b]	LPP[c]
1				
Accuracy	61 (41)	67.1 (45.9)	66.6 (50.9)	69.1 (47.7)
Fluency	17.6 (7.3)	21.7 (10.3)	18 (11.3)	23.9 (9.0)
2				
Accuracy	54.6 (34.0)	58.4 (44.6)	55.3 (45.6)	69 (40.4)
Fluency	12.3 (4.0)	11.1 (5.4)	9.3 (7.0)	14.6 (6.0)
3				
Accuracy	70 (44.6)	72.4 (48.6)	72.3 (54.4)	90 (49.4)
Fluency	17.7 (9.4)	29.0 (13.1)	24.3 (18.6)	59 (15.6)
4				
Accuracy	70 (40.3)	79.7 (57.7)	73 (57.6)	92.3 (61.7)
Fluency	27.4 (10.7)	45.6 (23.7)	30.3 (26.3)	57 (18.1)

[a] Subject passage preview.
[b] Taped words.
[c] Listening passage preview.

90% to 100%), 90% for the one LPP check, and 77% across the two SPP checks (72% and 82%). The low value for one of the SPP integrity checks occurred because the subject failed to say "done" after reading the passage and the teacher failed to read the instructions to the subject.

RESULTS

Differences in performance between baseline and the three treatment conditions were assessed using three approaches: (a) visual inspection of time-series data for Subjects 3 and 4 (Figures 1 and 2); (b) comparison of mean reading accuracy and fluency rates for each subject across conditions (Table 2); and (c) examination of the percentages of nonoverlapping data points between treatment conditions for accuracy and fluency (Table 3) (Scruggs, Mastropieri, & Casto, 1987).

Accuracy

Table 2 summarizes the mean accuracy and fluency rates on passage and word-list reading for each subject across baseline and treatment conditions. All 4 subjects showed the greatest increases in mean oral reading accuracy in passages under the LPP condition over baseline, with increases ranging from 8.1% for Subject 1 to 22.3% for Subject 4. SPP led to greater mean differences in oral reading accuracy than TW over baseline for all subjects.

Table 3
Percentages of Nonoverlapping Data Points Between Treatment Conditions

	LPP	SPP	TW
Accuracy			
LPP	—	14 (1)	57 (1)
		71 (2)	100 (2)
		86 (3)	86 (3)
		71 (4)	86 (4)
SPP	—	—	0 (1)
			0 (2)
			0 (3)
			14 (4)
Fluency			
LPP	—	28 (1)	43 (1)
		0 (2)	0 (2)
		71 (3)	100 (3)
		71 (4)	100 (4)
SPP	—	—	43 (1)
			14 (2)
			28 (3)
			28 (4)

Note. Numbers in parentheses refer to subjects. Percentages of nonoverlapping data were computed between treatment conditions based on the ordering of means.

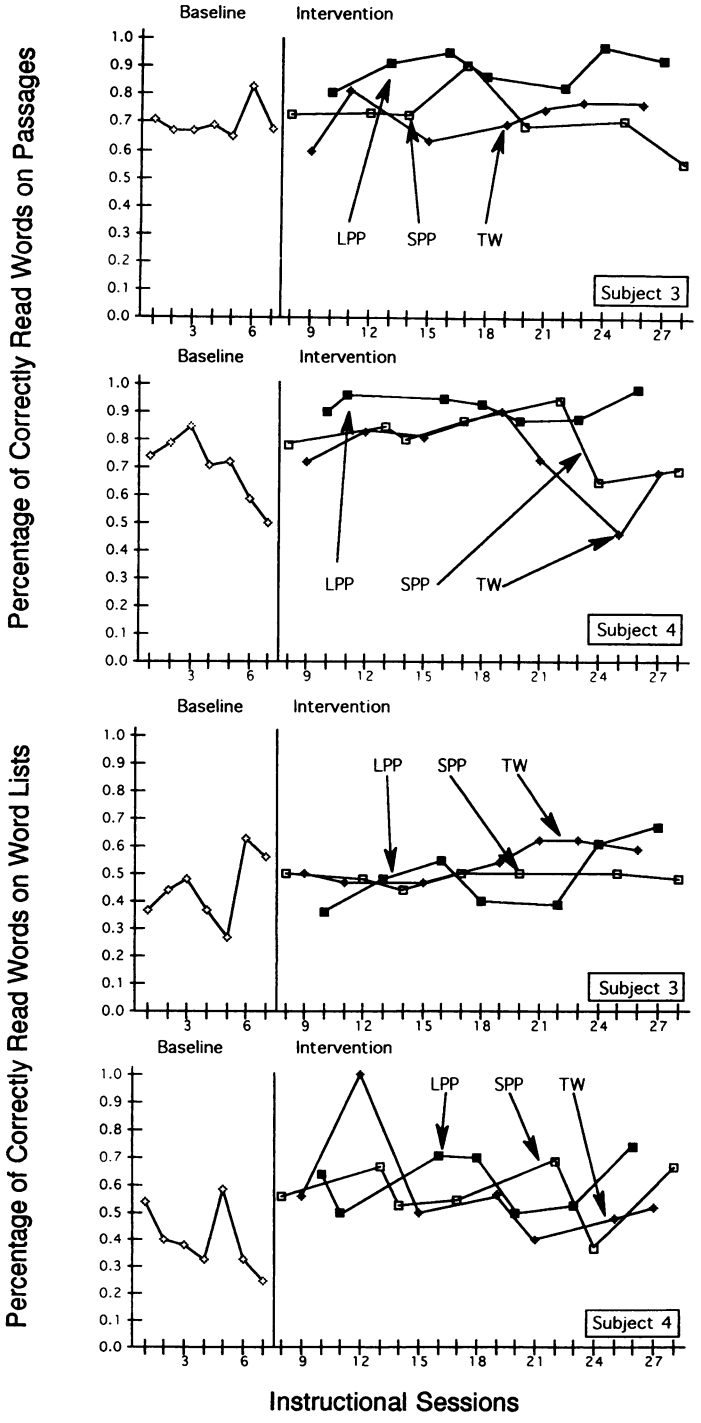

Figure 1. Percentage of correctly read words (accuracy) on passage and word-list reading for Subjects 3 and 4. LPP, listening passage preview; SPP, subject passage preview; and TW, taped words.

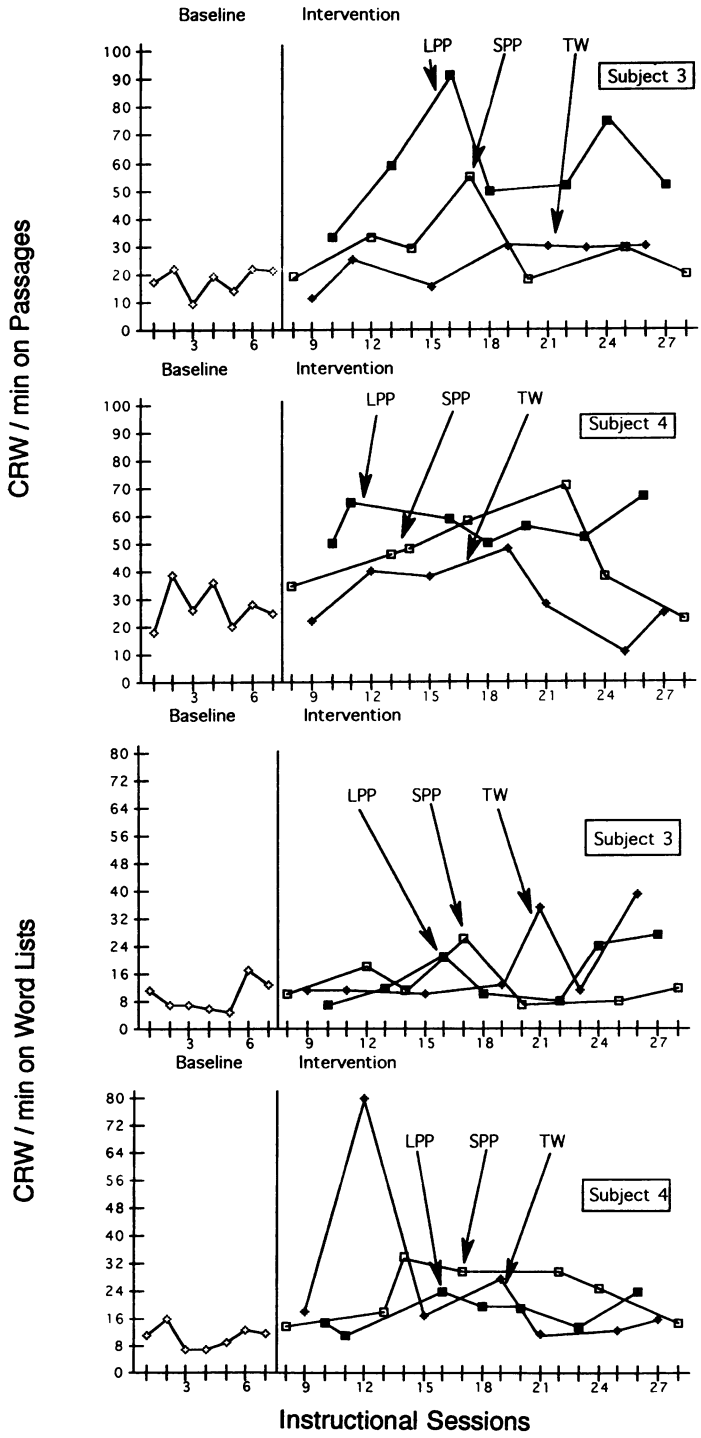

Figure 2. Number of words read correctly per minute (fluency) on passage and word-list reading for Subjects 3 and 4. LPP, listening passage preview; SPP, subject passage preview; and TW, taped words.

Table 3 presents the percentages of nonoverlapping data points between treatment conditions for all 4 subjects in passages, and Figure 1 depicts reading accuracy on both passages and word lists for Subjects 3 and 4. Subjects 2, 3, and 4 showed percentages of nonoverlapping data points between LPP and both SPP and TW of over 70%. This percentage for Subject 1 between LPP and TW was only 57%. For all 4 subjects, there was considerable overlap in the percentage of correctly read words between the SPP and TW conditions. Based on criteria suggested in Tawney and Gast (1984), none of the SPP data series and only two of the TW data series (Subjects 1 and 2) were stable for reading accuracy in passages. By comparison, all LPP data series were stable for this variable.

No consistent increases over baseline and no clearly discriminable data series between treatments were found for any of the subjects' oral reading accuracy on word lists. As a result, percentages of nonoverlapping data points were not calculated for oral reading accuracy on word lists. Table 2, however, indicates small mean differences between all three treatments and baseline, with the greatest differences occurring between TW and baseline for Subjects 1, 2, and 3. The mean differences among the treatments on reading accuracy were also small, amounting to maximum differences of less than 5 percentage points across subjects.

Fluency

Table 2 reveals that the treatment effects for LPP were most dramatic for Subjects 3 and 4, who more than doubled their mean oral reading fluency. Subjects 1 and 2 showed smaller mean increases in oral reading fluency between LPP and baseline. Of the three treatments, LPP led to the greatest increase in oral reading fluency over baseline. SPP also increased oral reading fluency over baseline for 3 of the 4 subjects. TW had no or minimal treatment effects, ranging from a mean decrease of 3 words read correctly per minute for Subject 2 to an increase of 6.6 words read correctly per minute for Subject 3.

Figure 2 shows oral reading fluency on the passages and word lists for Subjects 3 and 4. As summarized in Table 3, Subjects 3 and 4 demonstrated percentages of nonoverlapping data points between LPP and both SPP and TW of over 70%. For Subject 1, this percentage between LPP and both SPP and TW was 43% or less. The data for Subject 2 overlapped entirely for these three treatment conditions, suggesting no clear treatment differences. For all 4 subjects, percentages ranging from 14% to 43% were obtained between the SPP and TW conditions. Only one of the 16 data series reflecting fluency in passage reading met the stability criterion (LPP for Subject 4).

Because a large percentage of the words were unknown (i.e., 66%) on the assessment word lists, low fluency rates were obtained for all subjects. Subjects read at a mean rate of between 4 and 10.7 words read correctly per minute on word lists during baseline conditions. No increases over baseline or differences between the three treatment conditions were evident for Subjects 1 and 2. Subjects 3 and 4 demonstrated mean differences between the three treatment conditions and baseline, but there were no clearly discriminable differences between the data series. Accordingly, percentages of nonoverlapping data points were not calculated for fluency on word lists.

Although some subjects showed greater increases in oral reading accuracy and fluency than others following treatment, similar results were obtained in each case. Higher rates of accuracy in passage reading and higher percentages of nonoverlapping data points were found for LPP versus both SPP and TW. Accuracy on word lists did not differ substantially among the three treatment conditions for any of the subjects. Subjects also demonstrated greater oral reading fluency on passages following LPP than following SPP or TW. Small mean differences in oral reading fluency on word lists were observed, although there were no clear differences between the data series across treatments.

DISCUSSION

The results of this experiment showed LPP to yield the greatest immediate increases in accuracy and fluency in passages, although the magnitude of these gains differed across subjects. These results

are consistent with previous research that has found that LPP increases oral reading fluency in passages relative to no previewing and silent passage previewing (Rose, 1984a, 1984b, 1984c; Rose & Beattie, 1986; Rose & Sherry, 1984; Singh & Singh, 1984). Previous research on LPP has not, however, included reading accuracy as a dependent variable. In the present study, LPP was effective in increasing subjects' reading accuracy and fluency in passages. According to the instructional hierarchy, the strength of the LPP intervention lies in the combination of modeling plus drill under criterion stimulus conditions for the target academic behavior of oral reading.

Only small positive effects over baseline were obtained for all subjects with the SPP and TW treatments for passage reading. There are several possible reasons for these minimal treatment effects. First, subjects were reading texts above their instructional level. Reading difficult material may have suppressed potential treatment effects for an intervention such as SPP (a drill-only condition). The fact that SPP had stronger effects for the subjects who were better readers at the beginning of the experiment (Subjects 3 and 4) supports this hypothesis and emphasizes the importance of calibrating the difficulty of material selected in this type of research. Drill, by its very nature, is designed to strengthen already acquired behaviors. If in text reading there is a small percentage of acquired words, drill would not significantly increase oral reading fluency. When Rose (1984b) found that silent passage preview increased oral reading fluency over no previewing, subjects were reading at 30 to 50 words read correctly per minute during baseline, a level significantly higher than the subjects in the present study. The same pattern of results was found by Rose and Sherry (1984), whose subjects were reading over 40 words per minute during baseline.

Second, in the case of the TW treatment, a two-step screening procedure was conducted to increase the likelihood that subjects would not be able to read unknown words on the word lists. Subjects were expected to be able to read only 33% of the words correctly on the word lists at the beginning of the experiment. The results of reading accuracy during baseline, when subjects actually read with 34% to 44.6% accuracy, confirm that the screening procedure effectively identified unknown words as words that were unlikely to be read correctly without intervention. One problem with previous research on the TW treatment was that known and unknown words were not carefully specified. Careful specification was obtained in this study perhaps to the detriment of positive findings. Freeman and McLaughlin (1984) identified modeling as being the effective treatment component in efforts to increase word-list reading. Skinner and Shapiro (1989) argued instead that the drill condition of TW increased the opportunities to respond and therefore increased word-list reading proficiency. The lack of positive results for the TW treatment in this study supports Skinner and Shapiro's (1989) interpretation. One-trial modeling of accurate reading was not sufficient to increase word-list reading accuracy. Given the positive results of the other studies and the degree to which unknown words were poorly specified in those studies, it appears that drill improved word-list reading.

Third, variability in the difficulty of passages assigned to each instructional day probably contributed to the instability in passage reading, making it more difficult to obtain significant differences between conditions. Although subjecting the passages to readability formulas would have been an alternative, nomothetic approach for determining difficulty, we opted for the idiographic approach of actually assessing subjects' performance on the passages to be read.

This study suggests that instructional interventions for improving reading are likely to be more effective if they contain more active treatment components as specified by the instructional hierarchy. In this study, the LPP treatment addressed more dimensions of the target behavior and produced the greatest gains in performance. From an assessment perspective, refining the description of intervention targets (i.e., as accuracy, fluency, or generalization of reading) may also allow one to select an intervention best suited to increasing that dimension. For example, future research might be

aimed at determining whether an intervention that contains a modeling component is more effective at increasing reading accuracy than an intervention that contains only a drill component. Similarly, classifying stimuli as known or unknown is likely to determine whether the significant dimension of the dependent variable will be accuracy or fluency.

Another methodological issue that pertains primarily to instructional intervention research is the instructional match of student skill level and stimulus materials. In this experiment, Subjects 3 and 4 had the most robust and distinguishable treatment effects. Both subjects read the baseline passages with a mean accuracy of 70%. For Subjects 1 and 2, there was a poor instructional match. Choice of frustrating material may have suppressed the magnitude of treatment effects. However, because this was a preliminary investigation applying the instructional hierarchy, choosing difficult material was weighed against the ability to allow for increases in accuracy of responding. As students approach a more appropriate instructional match, their accuracy increases. As their accuracy increases, so does the potential for ceiling effects that may also suppress the effects of treatment. Future research might be aimed at refining the current procedures by specifying the optimal range of an individual subject's reading accuracy that is required to maximize treatment effects.

This study compared the effects of three relatively distinct instructional interventions on specific behavioral targets immediately following treatment. It would have been desirable to determine the effectiveness of these academic interventions over time. One drawback with using a multielement design was that conclusions could not be drawn about the effects of each treatment on overall increases in students' reading performance. Despite this limitation, exposure to the LPP procedure appeared to produce the largest increases in oral reading accuracy and fluency. Previous research has shown that oral reading fluency is a valid indicator of reading competence and correlates highly with standardized norm-referenced reading measures (Shinn, 1989; Shinn, Good, Knutson, Tilly, & Collins, 1992). Moreover, given that students can be expected to increase their oral reading fluency by approximately two words per week with typical instruction (Fuchs, Fuchs, Hamlett, Walz, & Germann, 1993), the immediate increases that were observed under the LPP condition appear to be promising. The LPP procedure can be readily used in the classroom, and cumulative effects may be obtained if the procedure is used consistently.

Other instructional interventions may also be compared meaningfully according to the instructional hierarchy. For instance, the modeling procedure used by Espin and Deno (1989) to increase sight-word acquisition could be compared to the feedback and self-monitoring procedure developed by E. Lalli and Shapiro (1990), which was also found to be effective at increasing sight-word acquisition. Another direction for future research is the refining of current instructional interventions, also using the instructional hierarchy as a model. It is known, for instance, that passage preview can be a strong instructional intervention for increasing reading accuracy and fluency. The conceptual framework offered by the instructional hierarchy suggests that passage preview might be further strengthened by adding a systematic error-correction procedure (e.g., Barbetta, Heron, & Heward, 1993; Barbetta, Heward, & Bradley, 1993). Support for this position can be found in the classwide peer-tutoring procedures developed for reading instruction by Greenwood and his colleagues (e.g., Greenwood, Carta, & Hall, 1988); these procedures contain a subject passage preview component with corrective feedback and public posting.

REFERENCES

Baer, D. M., Wolf, M. M., & Risley, T. R. (1968). Some current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis, 1,* 91–97.

Barbetta, P. M., Heron, T. E., & Heward, W. L. (1993). Effects of active student response during error correction on the acquisition, maintenance, and generalization of sight words by students with developmental disabilities. *Journal of Applied Behavior Analysis, 26,* 111–120.

Barbetta, P. M., Heward, W. L., & Bradley, D. M. C. (1993). Relative effects of whole-word and phonetic-prompt error correction on the acquisition and maintenance of sight words by students with developmental

disabilities. *Journal of Applied Behavior Analysis, 26,* 99–110.

Cohen, J. (1960). A coefficient of agreement for nominal scales. *Educational and Psychological Measurement, 20,* 37–46.

Espin, C. A., & Deno, S. L. (1989). The effects of modeling and prompting feedback strategies on sight word reading of students labeled learning disabled. *Education and Treatment of Children, 12,* 219–231.

Freeman, T. J., & McLaughlin, T. F. (1984). Effects of a taped-words treatment procedure on learning disabled students' sight-word reading. *Learning Disabled Quarterly, 7,* 49–54.

Fuchs, L. S., Fuchs, D., Hamlett, C. L., Walz, L., & Germann, G. (1993). Formative evaluation of academic progress: How much growth can we expect. *School Psychology Review, 22,* 27–48.

Greenwood, C. R., Carta, J. J., & Hall, R. V. (1988). The use of peer tutoring strategies in classroom management and educational instruction. *School Psychology Review, 17,* 258–275.

Haring, N. G., Lovitt, T. C., Eaton, M. D., & Hansen, C. L. (1978). *The fourth R: Research in the classroom.* Columbus, OH: Merrill.

Iwata, B. A., Pace, G. M., Kalsher, M. J., Cowdery, G. E., & Cataldo, M. F. (1990). Experimental analysis and extinction of self-injurious escape behavior. *Journal of Applied Behavior Analysis, 23,* 11–27.

Kern, L., Childs, K. E., Dunlap, G., Clarke, S., & Falk, G. D. (1994). Using assessment-based curricular intervention to improve the classroom behavior of a student with emotional and behavioral challenges. *Journal of Applied Behavior Analysis, 27,* 7–19.

Lalli, E. P., & Shapiro, E. S. (1990). The effects of self-monitoring and contingent reward on sight word acquisition. *Education and Treatment of Children, 13,* 129–141.

Lalli, J. S., Browder, D. M., Mace, F. C., & Brown, D. K. (1993). Teacher use of descriptive analysis data to implement interventions to decrease students' problem behaviors. *Journal of Applied Behavior Analysis, 26,* 227–238.

Pearson, P. D., Johnson, D. D., Clymer, T., Indrisano, R., Venezky, R. L., Baumann, J. F., Hiebert, E., & Toth, M. (1989). *Silver, Burdett, and Ginn.* Needham, MA: Silver, Burdett, and Ginn Inc.

Reynolds, C., & Stowe, M. (1985). *Severe discrepancy analysis: Operations manual.* Bensalem, PA: TRAIN Inc.

Rose, T. L. (1984a). The effects of previewing on retarded learners' oral reading. *Education and Treatment of the Mentally Retarded, 19,* 49–52.

Rose, T. L. (1984b). Effects of previewing on the oral reading of mainstreamed behaviorally disordered students. *Behavioral Disorders, 10,* 33–39.

Rose, T. L. (1984c). The effects of two prepractice procedures on oral reading. *Journal of Learning Disabilities, 17,* 544–548.

Rose, T. L., & Beattie, J. R. (1986). Relative effects of teacher-directed and taped previewing on oral reading. *Learning Disability Quarterly, 9,* 193–199.

Rose, T. L., McEntire, E., & Dowdy, C. (1982). Effects of two error correction procedures on oral reading. *Learning Disability Quarterly, 5,* 100–105.

Rose, T. L., & Sherry, L. (1984). Relative effects of two previewing procedures on LD adolescents' oral reading performance. *Learning Disability Quarterly, 7,* 39–44.

Scruggs, T. E., Mastropieri, M. A., & Casto, G. (1987). The quantitative synthesis of single-subject research: Methodology and validation. *Remedial and Special Education, 8,* 24–33.

Shapiro, E. S., & McCurdy, B. L. (1989). Direct and generalized effects of a taped-words treatment on reading proficiency. *Exceptional Children, 55,* 321–325.

Shinn, M. R. (1989). *Curriculum-based measurement: Assessing special children.* New York: Guilford.

Shinn, M. R., Good, R. H., Knutson, N., Tilly, W. D., & Collins, V. L. (1992). Curriculum-based measurement of oral reading fluency: A confirmatory analysis of its relation to reading. *School Psychology Review, 21,* 459–479.

Sindelar, P. T., Rosenberg, M. S., & Wilson, R. J. (1985). An adapted alternating treatments design for instructional research. *Education and Treatment of Children, 8,* 67–76.

Singh, N. N. (1990). Effects of two error-correction procedures on oral reading errors: Word supply versus sentence repeat. *Behavior Modification, 14,* 188–199.

Singh, N. N., & Singh, J. (1984). Antecedent control of oral reading errors and self-corrections by mentally retarded children. *Journal of Applied Behavior Analysis, 17,* 111–119.

Skinner, C. H., & Shapiro, E. S. (1989). A comparison of taped-words and drill interventions on reading fluency in adolescents with behavior disorders. *Education and Treatment of Children, 12,* 123–133.

Tawney, J. W., & Gast, D. L. (1984). *Single subject research in special education.* Columbus, OH: Merrill.

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